Introduction

The Revere Public School District, in Revere, Massachusetts is home to an extremely diverse and culturally rich group of students. Fifty-five percent of our 6400 student population is non-white. Currently 51 different languages are spoken by our students.
Due to its highly diverse makeup, Revere's transience is greater than most in the Commonwealth. Our district has several hundred new enrollments and withdrawals each year. Many of our families fall far below median income, into the poverty level as evidenced by out seventy-two percent free or reduced lunch rate.
This grant will allow us to jump start this public wireless service and bring it to students at a pivotal time in the age of the Internet. This pivotal time of which I speak is the ever growing use of smart phones and mobile devices as well as the inception and subsequent growing interest in cloud computing.

Required Information (all):

1a. In August of 2009, the IT departments of the Revere School District, City Of Revere, Revere Police and Revere Fire jointly implemented a true fault tolerant municipal fiber optic network capable of supporting significant bandwidth of data and voice. This network terminates in 21 locations citywide. Throughput at these locations is between 1 and 2 Gbps and scalable far beyond present speeds. The network was designed with the intent of providing the city with a converged voice/data/video network. Our hope from the projects inception was to provide the students of Revere with public Wi-Fi hotspots throughout municipal public areas. The Revere School District has 8 building terminations on this network and the city-side terminations number an additional 13. This network is the staunch foundation upon which a robust wireless network can be built.

1b. In 2009, we also designed a student guest network for the purpose of providing wi-fi access to students and guests of Revere High School. 4 Vlans in common areas of the building are given high-speed Internet access all the while securing and protecting school resources through access control lists at layer 2 and 3 of the network. As of December 2010, this service has been fully operational for seventeen months.

1c. The sole technical issue we have found is accountability for use of the service. We are currently seeking registration and authentication solutions to gain access to the service. As it is now, we provide a passphrase to be entered into the user's wireless device. This method leaves a lot to be desired from the standpoint of, "Who is on our network and is it being used for legitimate purposes?" One of our goals for this grant, if we receive it, is to secure a Nomadix appliance along with Xirrus hardware for high capacity wireless.

1d. All classroom teachers receive training in their first year of employment. On-going training occurs through the school librarians who assist teachers daily with the use of Internet and other media. The technology staff regularly meets with all librarians to ensure they are up-to-date with changes and improvements to our infrastructure. In turn, teachers train students to use the

Internet through media components embedded in all humanities classes. Further, web-based resources used in all mathematics classes engage students in Internet activity through the use of wireless laptops. All technical problems are handled by in house IT staff. Use of the services is contingent upon agreement of our acceptable use policy for students, faculty, and staff. Upon receipt of the grant, the superintendent has authorized a series of "Family Training Session" to be held in school buildings near all wireless hot-spots. All parents and students will be invited to attend. The training program will include basic instructions for accessing the wireless hot-spot as well as basic Internet safety, description of on-line terms of use (required by all participants), and activities that will result in termination of access. Trainings will be repeated on a regular basis (perhaps monthly) as demand dictates.

1e. In 2009, the School Department met with IT and Financial representatives from all other City departments to discuss the new fiber optic network. The talk of wireless for the city's residents was flying during that initial discussion. Our network should be considered a foundation or phase 1 of a never-ending number of phases. Revere's commitment to technological advancement has no boundaries. The entire city is on board to do what needs to be done to make this wireless project a reality.

2. Seventy-two percent of our students fall into the eligible margins of being provided either free or reduced cost meals. Our E-rate percentage is 86% this year.

3. The Revere Public Schools struggles to meet budget every year. The school's poverty rate of 72% is reflective of the larger community and the city budget. Therefore, the school district has not received a penny more than required by state law in funding the school department. In fact, a recent report by the Massachusetts Business Alliance for Education indicates a 16% gap in funding between urban districts like revere and out more affluent suburban counterparts. A recent report by the We rely heavily on grant funding to further our students' achievement.

4. Costs and quotes are shown below. The design is that of a fully autonomous wireless environment connected at 1 point to the school districts production network for management purposes and monitoring. It will then be routed to the Internet at our existing firewall where it will get the same filtering and control afforded to staff and students during the work day. The total cost will be $376,016.57. All portions are eligible for e-rate.

5. A sufficient portion of the school department budget is in place to not only support the existing infrastructure and systems, but to explore and seek new technologies. Our Superintendent and Mayor are both forward thinking in regard to technology and realize that technology in an instructional tool that can help us overcome obstacles resulting from high poverty and a transient student population. As such, funding for technology far exceeds that of neighboring districts and demographically-similar districts.

- All E-rate reimbursements are held in a separate technology account for constant renewal of the technology budget as opposed to being integrated with the general account as occurs in many other districts. In addition to grant funds received, our E-tare reimbursements are available to implement the Applicant Wireless Program. This year, our E-rate reimbursement exceeds $200,000.00

- We have seven full time IT staff members and an additional fifteen academic technology aides. Among other job responsibilities, the aides assist with equipment management and lab maintenance. Similar district have as few as two staff members in these 22 positions. All funding for these positions comes from the district budget. These staff members will be able to assist in training sessions for families. Funding will be provided by the district. IT staff members will be re-deployed to assist with hardware installation at all hot-spots.

6. Access to the Internet means many different things to different people in all walks of life. However, it all boils down to one least common denominator: The exchange of information. We imagine students accessing progress reports and assignments from smartphones or tablets from the bleachers in the ball field during a break at baseball practice, or contacting teachers to ask a question that they forgot to ask in class just 20 minutes prior, or downloading class texts to an ereader right after it was issued as required reading. We see the parents of these students logging in to monitor their child's attendance and grades; or contacting teachers when a child is home sick or missed an assignment. Teachers will be able to bring students into the field and conduct lessons on-site utilizing web content. We envision the Biology teacher, on a field trip to our local marsh, students with netbooks in hand, observing characteristics of particular flora and fauna on-line as they find actual samples. The possibilities and opportunities wireless Internet will have for our students are boundless. We hope to take the Applicant Wireless Program a step further to extend wireless Internet for students at all municipal buildings beyond our school facilities. Our DPW building, for instance, is right in the heart of multiple, densely populated apartment buildings that house many of our students. We are confident that this will reach students either in or at least in close proximity to their homes.

7. There are no other types of technology that would meet our Program's objectives. Thus, it is impossible to make a cost comparison with other programs. Wireless access for all students is integral to our program. The extent of poverty in our district precludes the vast majority of our students from accessing the Internet through subscription Internet services. The wireless hot-spot program we have described will provide such students and their parents with Internet accesses; allowing them to participate in the academic enrichments described in #6 (access to curricular materials, access to student performance information, and access to field-based learning experiences).

8. As described earlier, we hope to implement wireless at all municipal locations. A Xirrus product for 802.11 a/b/g/n appears to be one of the best manageable solutions based upon our research. We plan to install a single, multi-radio, multi-antenna outdoor access point at each location. We will install between 2 and 10 smaller indoor access points in common areas of each school. The quantity installed will be determined by size, layout and construction of the building (See figures and diagrams below). We seek to have continued benefit for students and generate creativity in teacher instruction. We hope to see a long-term increase in student achievement and students' technological capacity. The former will be measured through standardized testing and the latter through our soon-to-be-implemented annual technology surveys.

9. Our plan is not to have wide-open Internet access. Individuals accessing the Internet through our hot-spots will need to agree to a Terms Of Use policy prior to connection. The parameters of

the Terms of Use will be clearly articulated during the Family Training nights described above. In addition, the design of the network will prohibit access to illicit or otherwise non-educational content and the school's and city's private network/secured resources. Firewalls will be configured to allow web-browsing only through ports 80 and 443. Gateway anti-virus and malware protection will be in place at the firewall to prevent end-users and end-nodes from infection. These preventive measures will keep misuse, abuse, waste, and fraud to an absolute minimum.

10. All members of the school community including teachers, staff members, and students are required to sign our Authorized Use Policy (AUP) annually. In addition, parents/guardians of our students are required to sign indicating that they are aware of and understand the AUP to which their children will be held. The Terms of Use agreed to by all users of the hot-spot access will include our AUP with some modifications to specifically address the off-campus Internet access through the Revere Public Schools' network. Our full AUP is available on page 60 of the student handbook and can be accessed through the following link: Handbook
Our AUP reads in part:
2. Violations of this Acceptable Use Policy include, but are not limited to, the following conduct:

a) Intentionally placing unlawful and/or inappropriate information on a system.
b) Using profane, vulgar, threatening, defamatory, abusive, discriminatory, harassing or otherwise objectionable or criminal language in a public or private message.
c) Sending messages or posting information that the user knows or has reason to know would likely result in the loss of a recipient's work or system.
d) Sending "chain letters" or "broadcast" messages to lists or individuals.
e) Participating in other types of use which would cause congestion of the network or interfere with the work of others.
f) Intentionally using the network in a manner that would violate any U.S. or state law. This includes, but is not limited to, unauthorized use of copyrighted material, transmission of threatening material and spreading of computer viruses.
g) Intentionally accessing or transmitting materials that are obscene, sexually explicit, and accessing any prohibited sites on the Internet.
h) Revealing one's password to anyone else.
i) Attempting to gain unauthorized access to system programs or computer equipment, including attempts to override, or to encourage others to override, any firewalls established on the network.
j) Attempting to harm, modify or destroy data of another user.
k) Performing any other deliberate act which would in any way subject the user or the Revere Public Schools to any civil or criminal action.
l) Discussing highly sensitive or confidential school department information in e-mail communications.
m) Using the Revere Public Schools technology network to buy, sell or advertise anything.
n) Using the Revere Public Schools technology network for gambling.
o) Use or possession of software which has been downloaded by a student or is otherwise in the student's possession without the appropriate registration of the software, including the payment of any fees to the owner of the software.

p) The Revere Public Schools may discipline a student or staff member for violating its Acceptable Use Policy while accessing the Internet or Revere System/network away from the Revere Public Schools when a user's activity relates to, or adversely affects the Revere Public Schools, its students, or staff.

Our AUP further reads:

"Any violation of the terms of the Acceptable Use Policy may result in the suspension or revocation of Internet and/or computer privileges, and may also result in school disciplinary action."

Required Information (Schools Only):

(1) Building Locations:

a. Garfield 176 Garfield Ave. Revere, MA 02151
b. Revere High School 101 School St. Revere, MA 02151
c. Beachmont School 15 Everard St. Revere, MA 02151
d. Lincoln School 68 Tuckerman St. Revere, MA 02151
e. Whelan School 107 Newhall St. Revere, MA 02151
f. Susan B. Anthony 107 Newhall St. Revere, MA 02151
g. McKinley School 65 Yeaman St. Revere, MA 02151
h. Paul Revere School 395 Revere St. Revere, MA 02151
i. DPW 324 Rear Charger St. Revere, MA 02151
j. Elder Affairs 25 Winthrop Ave Revere, MA 02151
k. Public Library 179 Beach St Revere Revere, MA 02151
l. City Hall 281 Broadway Revere, MA 02151
m. Police Dept. 400 Revere Beach Parkway Revere, MA 02151
n. Revere FD 3 Overlook Dr. Revere, MA 02151

(2) Revere Public Schools
Dianne K. Kelly
Assistant Superintendent
Curriculum, Instruction, and Assessment
101 School Street
Revere, MA 02151
781-286-8226

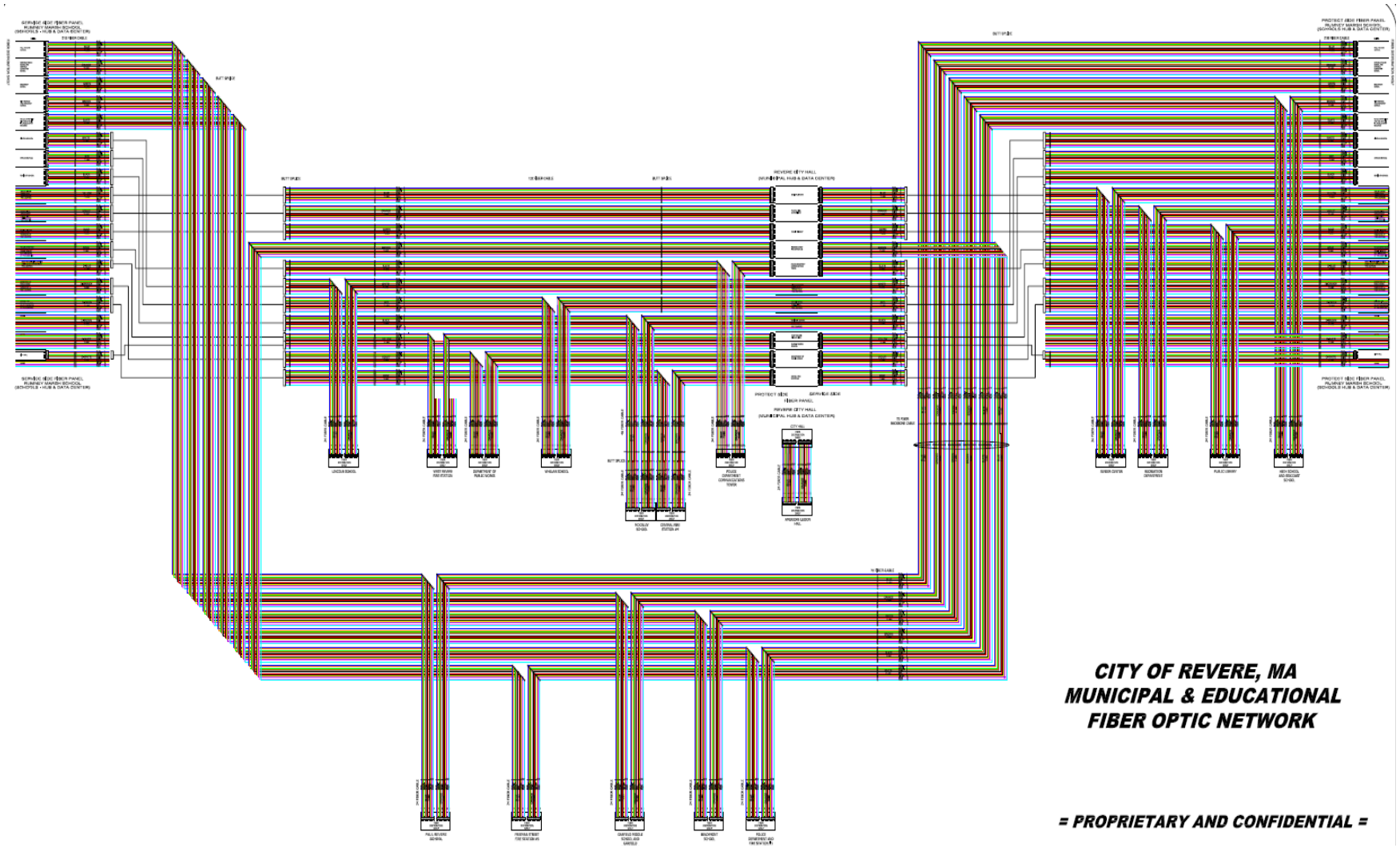
All public locations listed above will be served by this service. The non-school locations (i-n) were chosen because of their proximity to dense residential areas where our students reside.

(3) The Revere Public Schools (RPS) is a K-12, urban, public school district focused on rigor with the primary goal of preparing students to leave high school equipped with 21st century skills. By this, we mean they can not only get to college, but stay in college through degree attainment. Alternatively, all students will be well situated to succeed in any career. Located just north of Boston, the RPS has a low-income rate of 71%, with 44.7% of students speaking a first language other than English and 10.2% of students who are English Language Learners. Each year since 2002 the district's Math and ELA State test scores, and SAT and AP results have improved, and students and teachers are now proud as a result of greater recognition. In 2010, our schools exceeded the state average on 32 out of 66 state exams.

Such results are unprecedented in urban districts where the challenges of poverty and language often impede progress. The overall reputation of the district has been enhanced in the eyes of the community and the State Department of Education. One of our schools recently became the state's first Innovation School while another was named a Title I Distinguished School and was asked to apply for the US Department of Education's Blue Ribbon Award. This success is a result of reformation and change. guided by our mission to meet the diverse and challenging needs of students through the academic, civic, and social domains. We embrace a district-wide belief system, held by students, parents, and staff, that ALL students can succeed. That belief system was instilled in the stakeholders through intense professional development, the creation of a common language around this belief system, and by raising the standard of excellence for students. With this philosophy, the district has eliminated its multi-track curriculum that pointed only a portion of students toward college. Now every student is on a college track. We believe all students will benefit from the richer educational experiences they will enjoy when internet access is available at home as well as at school. This added resource, available to students beyond the school day, will further our initiative for high standards for student learning, a rigorous curriculum, and quality instruction.

(4) The internet access program will service all Revere Public Schools students and their parents (grades K-12 and post-graduate special needs students). Currently, this includes 6,441 students and 537 teachers. We imagine students accessing progress reports and assignments from smartphones or tablets from the bleachers in the ball field during a break at baseball practice, or contacting teachers to ask a question that they forgot to ask in class just 20 minutes prior, or downloading class texts to an ereader right after it was issued as required reading. Rather than leave home in the evening to go to the public library to research a topic, students would be able to conduct internet research as they babysit siblings in their home. We see the parents of these students logging in to monitor their child's attendance and grades; or contacting teachers when a child is home sick or missed an assignment. Teachers will be able to bring students into the field and conduct lessons on-site utilizing web content. We envision the Biology teacher, on a field trip to our local marsh, students with netbooks in hand, observing characteristics of particular flora and fauna on-line as they find actual samples. At present, middle and high school teachers have been directed not to assign projects that require students to conduct research out side of class time. This is a result of the fact that so few students have internet access outside of school. Our one public library serves as they only free internet access point outside of school. This program would change this situation completely. The possibilities and opportunities wireless Internet will have for our students are boundless.

(5) We will be able to track how many hours participants spend logged in through our access points. This data will enable us to determine the extent to which we have closed the internet access gap. Our curriculum directors will be able to work with teachers to collect data on how frequently they assign internet based learning tasks and the level of student success. Similarly, curriculum directors will be able to collect data on the use of technology in field experiences such as the flora and fauna biology lesson described above. Through these metrics we can determine the impact the program has on students' 21st century technology skills.



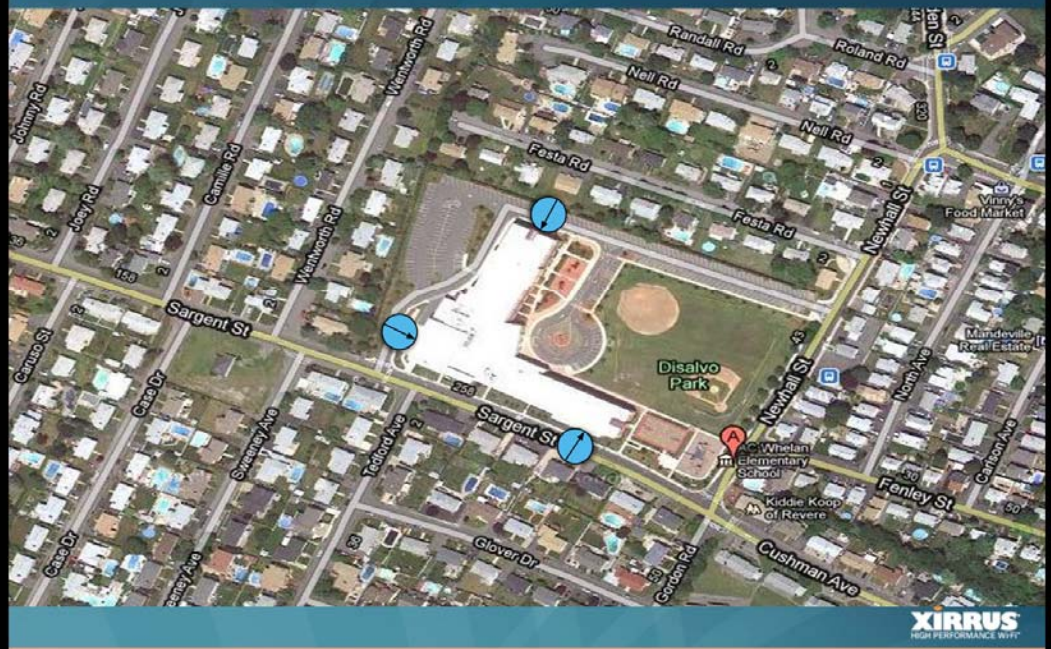
CITY OF REVERE, MA
MUNICIPAL & EDUCATIONAL
FIBER OPTIC NETWORK

Predictive Array Placement for HS

Predictive Array Placement for McKinley

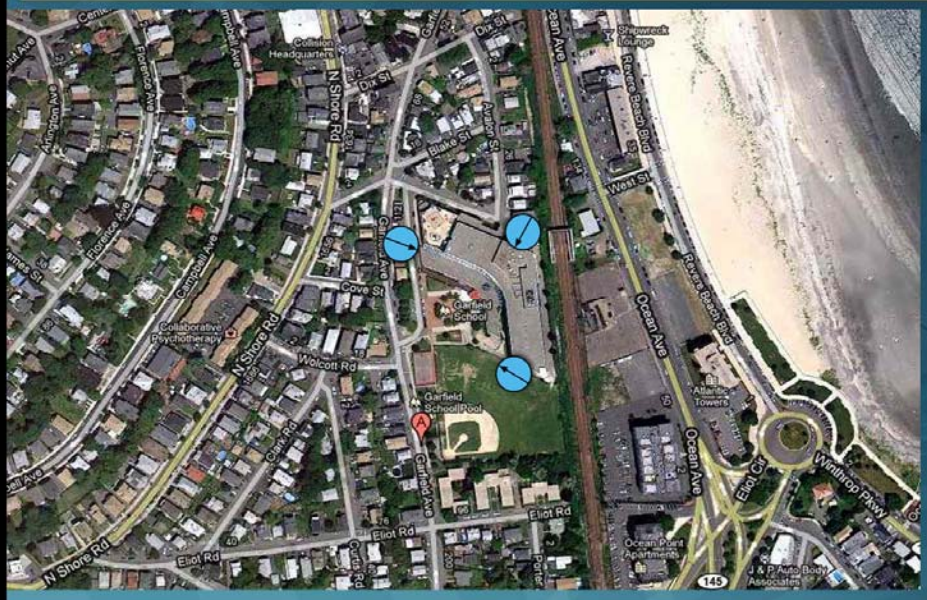
Predictive Array Placement for Paul Revere

Predictive Array Placement for Whelan



Predictive Array Placement for Lincoln

Predictive Array Placement for Garfield



XIRRUS
HIGH PERFORMANCE Wi-Fi

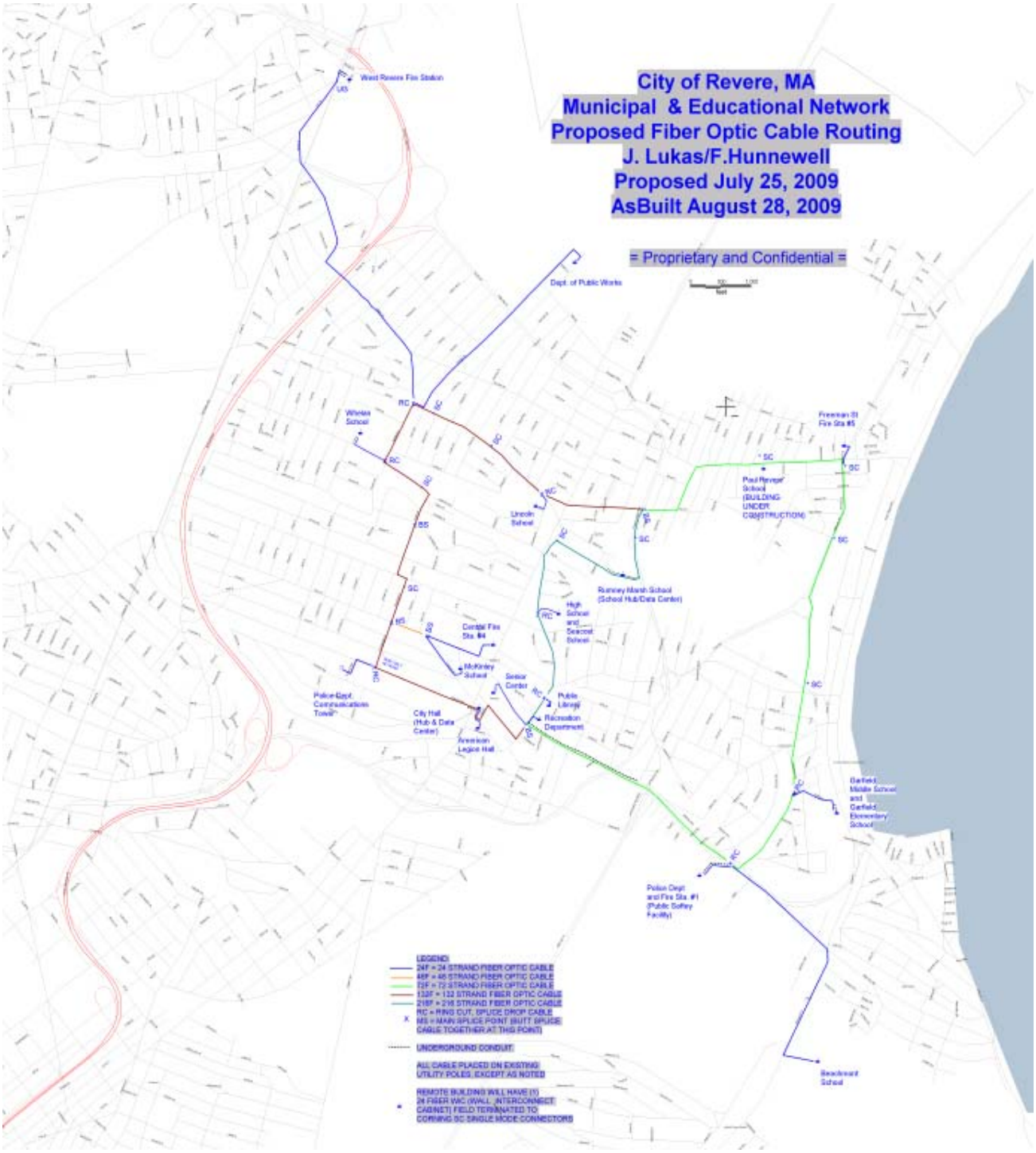
Model Number	List Price	Description	Quantity	Extended List Price	Discount	Extended Discounted Price
XN4	$2,250	4 radio 802.11a/b/g/n Wi-Fi Array hardware.	21	$47,250.00	40.0%	$28,350.00
AO-4ABGN	$2,250	802.11a/b/g/n ArrayOS Software for XN4 Wi-Fi Arrays.	21	$47,250.00	40.0%	$28,350.00
AO-4RXM-ALL	$250	Bundle of RF Performance Manager (RPM), RF Security Manager (RSM), and RF Analysis Manager (RAM) ArrayOS feature packages for XN4 Wi-Fi Arrays.	21	$5,250.00	40.0%	$3,150.00
XP1-MSI-75	$250	1 Port 75W Power over Gigabit Ethernet Midspan Injector. Remotely powers 1 XN8, 1 XN4, 1 XS16, 1 XS8, or 1 XS4. Requires order of one XS-PWR-NA power cord.	21	$5,250.00	25.0%	$3,937.50
XS-PWR-NA	$0	North American power cord. Must be associated with order of powered XN, XS, XP, XE, or XM product.	21	$0.00	100.0%	$0.00
SU-HARDWARE-PREM-1	3% of HW List	1 Year Premium Support for Xirrus Hardware Systems. Applicable to XN- and XS-series Array hardware, XP8-MSI-xx, XP2-MSI-xx, XM-33x0-xx appliances, and XE-4000 (electronics only). Includes priority phone/e-mail support and next day advanced hardware	21	$1,417.50	15.0%	$1,204.88
SU-ARRAYOS-PREM-1	9% of SW List	1 Year Premium Support for AO-XXX Software on XS- and XN-series Wi-Fi Arrays. Includes priority phone/e-mail support, software fixes, and unlimited software upgrades.	21	$4,725.00	15.0%	$4,016.25
XN8	$3,750	8 radio 802.11a/b/g/n Wi-Fi Array hardware.	37	$138,750.00	40.0%	$83,250.00
AO-8ABGN	$3,750	802.11a/b/g/n ArrayOS Software for XN8 Wi-Fi Arrays.	37	$138,750.00	40.0%	$83,250.00
AO-8RXM-ALL	$500	Bundle of RF Performance Manager (RPM), RF Security Manager (RSM), and RF Analysis Manager (RAM) ArrayOS feature packages for XN8 Wi-Fi Arrays.	37	$18,500.00	40.0%	$11,100.00
XP1-MSI-75	$250	1 Port 75W Power over Gigabit Ethernet Midspan Injector. Remotely powers 1 XN8, 1 XN4, 1 XS16, 1 XS8, or 1 XS4. Requires order of one XS-PWR-NA power cord.	37	$9,250.00	25.0%	$6,937.50
XS-PWR-NA	$0	North American power cord. Must be associated with order of powered XN, XS, XP, XE, or XM product.	37	$0.00	0.0%	$0.00
SU-HARDWARE-PREM-1	3% of HW List	1 Year Premium Support for Xirrus Hardware Systems. Applicable to XN- and XS-series Array hardware, XP8-MSI-xx, XP2-MSI-xx, XM-33x0-xx appliances, and XE-4000 (electronics only). Includes priority phone/e-mail support and next day advanced hardware	37	$4,162.50	15.0%	$3,538.13
SU-ARRAYOS-PREM-1	9% of SW List	1 Year Premium Support for AO-XXX Software on XS- and XN-series Wi-Fi Arrays. Includes priority phone/e-mail support, software fixes, and unlimited software upgrades.	37	$14,152.50	15.0%	$12,029.63
XM-3320-20	$9,000	XMS (Xirrus Management System) Linux-based appliance and 20 Wi-Fi Array License. XM-3320 hardware platform supports management of up to 100 Arrays. Rack mountable, 1U chassis. Requires order of appropriate XS-PWR-XX cord for the country where the Array will be deployed.	1	$9,000.00	25.0%	$6,750.00
XS-PWR-NA	$0	North American power cord. Must be associated with order of powered XN, XS, XP, XE, or XM product.	1	$0.00	0.0%	$0.00
SU-HARDWARE-PREM-1	3% of HW List	1 Year Premium Support for Xirrus Hardware Systems. Applicable to XN- and XS-series Array hardware, XP8-MSI-xx, XP2-MSI-xx, XM-33x0-xx appliances, and XE-4000 (electronics only). Includes priority phone/e-mail support and next day advanced hardware	1	$120.00	15.0%	$102.00
SU-APPLICATIONS-PREM-	12% of SW List	1 Year Premium Support for Xirrus XA and XM management products. Includes priority phone/e-mail support, software fixes, and unlimited software upgrades.	1	$600.00	15.0%	$510.00
SV-CONFIG	$3,000	Supervision of installation and system configuration / optimization - with diagrams and saved configuration files. Essential training of customer on site. Conducted by Xirrus personnel. Rate per one day of service. **Note:** Xirrus is not responsible for installing data cables or power to Arrays, or for any installation activity that alters physical building structure.	1	$3,000.00	100.0%	$0.00
XA-3300-CC-50	$10,000	XMS (Xirrus Management System) and 50 Wi-Fi Array License to operate on customer-supplied server.	1	$10,000.00	25.0%	$7,500.00
XE-4000-AC	$1,250	Outdoor Enclosure for Array with Fan, Heater, and Lightning Protection operating on 110/220V AC power. Mounting kit (XE-4005-xxx) MUST be ordered separately. Fits all Arrays models. Rated for operation from -40°C to +55°C ambient temperature.	23	$28,750.00	15.0%	$24,437.50
XE-4005-POLE	$250	Pole mounting kit for XE-4000. Includes mounting kit only - order XE-4000 enclosure separately.	23	$5,750.00	15.0%	$4,887.50
External Antennaes	$225		10	$2,250.00	15.0%	$1,912.50
				$494,177.50		**$315,213.38**

12	J8692A	HP	HP ProCurve Switch 3500yl-24G-PWR Intelligent Edge - Switch - 24 ports - EN, Fast EN, Gigabit EN - 10Base-T, 100Base-TX, 1000Base-T + 4 x shared SFP (empty) - 1U -	2,499.20	29,990.40
24	J4859C	HP	HP ProCurve Gigabit-LX-LC Mini-GBIC - Transceiver module - SFP - Gigabit EN - 1000Base-LX	562.10	13,490.40
1	J9642A	HP	HP E5406 zl Switch - Switch - L4 - managed - rack-mountable - PoE - with HP E5400 zl Switch Premium License	1,581.25	1,581.25
1	J8705A	HP	PROCURVE 5400ZL 20P + 4MINI GBIC MODULE	2,287.35	2,287.35
1	J8706A	HP	HP ProCurve Switch 5400zl 24p Mini-GBIC Module - Expansion module - Gigabit EN - 24 ports	2,810.60	2,810.60
				Subtotal	$50,160.00

1	966-5600-002	NOMADIX	AG 5600 Bundle - Platform 500 users 966-5600-001 + 1 Year Software License 716-5604-001	6,763.44	6,763.44
1	716-5651-002	NOMADIX	AG 5600 User Count Upgrade option of 500 users (max. 2000 users upgrade)	879.75	879.75

	Subtotal	$7,643.19
INSTALLATION not included unless itemized above.	Shipping	$0.00
PRICES SUBJECT TO CHANGE AT ANY TIME.	**GRAND TOTAL**	**$7,643.19**

$3000 for Nomadix installation


City of Revere, MA
Municipal & Educational Network
Proposed Fiber Optic Cable Routing
J. Lukas/F.Hunnewell
Proposed July 25, 2009
AsBuilt August 28, 2009
= Proprietary and Confidential =
West Revere Fire Station
MS
Dept. of Public Works
Whelan School
RC
SC
Lincoln School
Freeman St Fire Sta #5
Paul Revere School (BUILDING UNDER CONSTRUCTION)
Rumney Marsh School (School Hub/Data Center)
High School and Seacoat School
Central Fire Sta #4
McKinley School
Senior Center
Public Library
Recreation Department
Police-Dept Communications Tower
City Hall (Hub & Data Center)
American Legion Hall
Garfield Middle School and Garfield Elementary School
Police Dept and Fire Sta #1 (Public Safety Facility)
Beachmont School
LEGEND:
24F = 24 STRAND FIBER OPTIC CABLE
48F = 48 STRAND FIBER OPTIC CABLE
72F = 72 STRAND FIBER OPTIC CABLE
132F = 132 STRAND FIBER OPTIC CABLE
216F = 216 STRAND FIBER OPTIC CABLE
RC = RING CUT, SPLICE DROP CABLE
MS = MAIN SPLICE POINT (BUTT SPLICE CABLE TOGETHER AT THIS POINT)
UNDERGROUND CONDUIT
ALL CABLE PLACED ON EXISTING UTILITY POLES, EXCEPT AS NOTED
REMOTE BUILDING WILL HAVE (1) 24 FIBER WIC (WALL INTERCONNECT CABINET) FIELD TERMINATED TO CORNING SC SINGLE MODE CONNECTORS